URS

February 14, 2013

VIA ELECTRONIC MAIL

Ms. Katharine K. Buckner
Sandhills and Pulp & Paper Permitting Section
Engineering Services Division
Bureau of Air Quality
South Carolina Department of Health and Environmental Control
2600 Bull Street
Columbia, South Carolina 29201-1708

Re: Resolute FP US Inc.
Part 70 Operating Permit TV-2440-0005
Permit Renewal Application
Supplemental Emission Calculations

Dear Ms. Buckner:

On behalf of Resolute FP US Inc., please find the attached supplemental emission calculations that you requested by electronic mail on February 12, 2013.

The attached supplemental emission calculations are referenced by the Alternative Form D for the woodyard, facility roads, and landfill at the Catawba Mill. These calculations were also submitted previously as part of the 2004 Part 70 operating permit renewal application. Please include this submittal as Attachment 6 of the 2013 Part 70 operating permit renewal application.

If you have any questions, require further clarification, or need additional information regarding the application or this submittal, please do not hesitate to contact me.

Sincerely,

Steven R. Moore

Steven R. Moore
URS Corporation

Attachment

cc: Mr. Dale Herendeen – Resolute FP US Inc. (via electronic mail)

URS Corporation
128 Millport Circle, Suite 100
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6.1 Woodyard Emissions

6.1.0 Actual Emissions:

Qualitatively, the woodyard emission unit may emit particulate matter (PM) and VOCs (the VOCs may be in the form of methanol and/or other HAPs/South Carolina air toxics). Quantitatively, particulate emissions may be estimated by using emission factors developed by PEDCo. The woodyard emission unit contains a number of operations which result in particulate matter emissions. Emission estimates for different operations in the woodyard are given below. For permitting purposes, the woodyard is considered to be a single emission unit.

The woodyard operations at Resolute's Catawba facility that result in particulate matter emissions can be summarized into the following activities: debarking operations, roundwood related chip handling/storage, purchased chip unloading/handling/storage, wastewood hauling, chip piles, and general wood processing.

	PM Emissions (tons/yr)	**VOC Emissions (tons/yr)**
Debarking Operations	26.9	(*)
Roundwood Related Chip Handling/ Storage	3.0	(*)
Purchased Chip Unloading/Handling/ Storage	1.2	(*)
Wastewood Hauling	1.3	(*)
Chipper Operations	12.1	(*)
Chip Piles	53.0	(*)
General Wood Processing	7.5	(*)
TOTAL:	**105.0**	**(*)**

(*) There are currently no accurate and reliable data available to estimate VOC emissions from woodyard activities.

6.1.1 Debarking Operations (PM):

(assumed to include all debarking drums)

An emission factor for debarking operations has been reported by PEDCo. Environmental, Inc. at the Second Symposium on Fugitive Emissions as a result of work performed for EPA under Contract No. 68-02-1375, Task Order No. 33, publication no. EPA 450/3-77-010. The facility typically debarks about 65% of the cords received. The emission factor is 0.024 lb/ton, and its use is summarized below.

F = W x E

F = fugitive emission resulting from debarking operations, lb/year
W = amount of roundwood debarked, tons/year
E = emission factor, lb fugitive emissions/ton roundwood debarked

F = (0.65 x 3,445,000 tons roundwood/yr)) x (0.024 lb fugitive emissions/ton roundwood)

PM = 53,742 lb fugitives/yr
PM = 26.9 tons/yr

6.1.2 Roundwood Related Chip Handling/Storage (PM):

(assumed to include all log handling, chip handling, log storage piles, storage piles, and silos)

An emission factor for roundwood related chip handling/storage operations has been reported by PEDCo. Environmental, Inc. at the Second Symposium on Fugitive Emissions as a result of work performed for EPA under Contract No. 68-02-1375, Task Order No. 33, publication no. EPA 450/3-77-010. The emission factor is 1.0 lb/ton. However, the emission factor was developed for 100% sawdust. Since the total weight of chips contains less than 1% fines, the physical exposure to dusting as compared to 100% sawdust will substantially be reduced. Therefore, a dusting correction factor of 0.5 will be applied which accounts for the reduction to the physical exposure to dusting in the absence of 100% sawdust as given in the above-named reference. Bark accounts for an estimated 10-20% of the total tonnage weighed across woodyard scales (PEDCo.). The percentage of chip fines found in on-site chipping operations has been determined through chip analysis to be 0.4% for pine chipping and 0.3% for hardwood chipping. Resolute's Catawba facility processes mainly pine cords. About 95% of the 3,445,000 tons per year are pine, and about 5% are hardwood. Therefore, the more conservative percentage, 0.4%, will be used to estimate emissions. Emission estimates are:

F = W x (1 - %B) x %F x E x C

F = fugitive emission resulting from roundwood related chip handling/storage activities, tons/yr
W = amount of roundwood used, tons/yr
%B = fraction of roundwood that is in the form of bark
%F = fraction of roundwood that is in the form of fines
E = emission factor, lb fugitive emissions/ton roundwood used
C = dusting correction factor

F = (3,445,000 tons/year) x (1 - 0.14) x (0.004) x (1.0 lb fugitive emissions/ton pine roundwood) x (0.5)

PM = 5,925 lb fugitive emissions/year
PM = 3 tons/year

6.1.3 Purchased Chip Unloading/Handling/Storage (PM):

(assumed to include all purchased chip handling, chip storage piles, and chip silos)

Historical chip classification data indicates that both pine and hardwood purchased chips contain 0.2% fines by weight. The reason that purchased chips have a lower fines content than chips produced on-site is that purchased chips are screened prior to delivery. Typically about 35% of the cords that the facility receives are in the form of chips. The emission factor is 1.0 lb fugitive emissions/ton fines. The emission estimate is

F = W x E

F = fugitive emissions from purchased chip unloading/handling/storage, lb/year
W = amount of fines purchased, tons
E = emission factor, lb fugitive emissions/ton fines

F = (0.35 x 3,445,000 tons/year) x (0.002 ton fines/ton chips) x (1.0 lb fugitive emissions/ton fines)

PM = 2,412 lb fugitive emissions/year
PM = 1.2 tons/year

6.1.4 Wastewood Hauling (PM):

(assumed to include all activities associated with woodwaste hauling)

Wastewood contains a predominance of bark and smaller fines and pins particles. According to PEDCo., analyzed mill wastewood samples were found to contain 7.5% fines. The amount of woodwaste hauled at Resolute's Catawba facility is assumed to be 1% of the total tons consumed per year (3,445,000 tons/yr). The emission factor is 1.0 lb fugitive emissions/ton wastewood fines hauled. The emission estimate is

F = W x C x E

F = fugitive emissions resulting from wastewood hauling, lb/year
W = amount of wastewood hauled, tons/year
C = fines concentration of wastewood, ton fines/ton wastewood

E = emission factor, lb fugitive emissions/ton wastewood fines

F = (3,445,000 tons consumed/year) x (0.01 tons woodwaste/ tons wood consumed) x (0.075 tons fines/tons wastewood) x (1.0 lb fugitive emissions/ton wastewood fines)

PM = 2584 lb fugitive emissions/year
PM = 1.3 tons/year

6.1.5 Chipping Operations (PM):

(assumed to include all chippers and rechippers)

An emission factor applicable to slasher operations has been developed by PEDCo. Environmental, Inc. at the Second Symposium on Fugitive Emissions as a result of work performed for EPA under Contract No. 68-02-1375, Task Order No. 33, publication no. EPA 450/3-77-010. Although all slasher operations at the facility have ceased, emissions from all chippers and rechippers have been estimated using emission factors for the previous slasher operation. Since the chippers will produce far less sawdust than the slasher operations, emission estimates are an overestimate of particulate matter emissions. The emission factor is 1.0 lb fugitive emissions/ton sawdust produced. Typical saws are 7/16 inches wide, while typical logs are 8 inches in diameter and 50 feet long. A log of these dimensions would be cut by 7 of the 9 saws. Assuming that all cords that the facility receives are sawed gives an emission estimate of 16 tons per year as shown by the following calculations:

$F = W \times N \times E$

F = fugitive emissions resulting from chipping operations, lb fugitive emissions/yr
W = amount of cords chipped per year
N = amount of sawdust produced per cord, lb sawdust/cord
E = emission factor, lb fugitive emissions/ton sawdust

where: $N = L \times C \times S \times A \times D$

L = number of logs per cord
C = number of cuts made per log
S = saw width, ft/cut
A = cross-sectional area of log, ft^2
D = density of the wood, lb/ft^3

N = (10 logs/cord) x (7 cuts/log) x (0.0365 ft/cut) x [π x (0.333 ft)^2] x [(6,000 lb/cord) x (cord/128 ft^3)]

N = 42 lb sawdust/cord

F = (3,445,000 tons/year x 2,000 lb/ton x cord/6,000 lb) x (42 lb sawdust/cord) x (ton/2,000 lb) x (1 lb fugitive emissions/ton sawdust)

PM = 24,100 lb fugitive emissions/year
PM = 12.1 tons/year

6.1.6 Chip Piles (PM):

(assumed to include all log and chip piles)

Table 8.19.1-1 of AP-42 (4th ed.) "Uncontrolled Particulate Emission Factors for Sand and Gravel Processing Plants" reports the following emission factors for active storage piles. The emission factors include the following distinct source operations in the storage cycle: (1) loading of aggregate onto storage piles (batch or continuous drop operations), (2) equipment traffic in storage areas, and (3) wind erosion of pile (batch or continuous operations). The factors assume 8-12 hours of activity per 24 hours, so the emission factors are multiplied by 2 to estimate continuous activity. The factors have a quality rating of D, so it is assumed that the factors are an order-of-magnitude estimate. For this reason, the factors are multiplied by ten for conservatism. The factors for active storage piles are:

PM (<= 30 microns): 13.2 lb/acre/day

The chip pile at the Catawba facility has a base diameter of about 250 feet, which corresponds to an area of 49,000 ft^2 or 1.1 acres. The emission estimates are as follows:

PM = (2 x 10) x (13.2 lb/acre/day) x (1.1 acres) x (365 days/yr) x (ton/2,000 lb)
PM = 53.0 tons/yr

6.1.7 General Wood Processing (PM):

Although the above categories of woodyard activities will likely account for all particulate matter emissions, the following emission estimate is provided for permitting purposes in order to ensure conservative emission estimates in the woodyard emission unit.

There are eight cyclones in the woodyard emission unit; the cyclones are considered integral parts of the operation, not control devices. Assuming an average outlet grain loading of 0.02 gr/cf and an average flow rate of 10,000 cfm, emissions are estimated to be:

PM Emissions = (0.02 gr/ft^3) x (10,000 ft^3/min) x (lb/7,000 gr) x (60 min/hr) x (8,760 hrs/yr) x (ton/2,000 lb)

PM = 7.5 tons/yr

6.1.8 General Wood Processing (VOCs):

There are currently no accurate and reliable emissions data available to estimate VOC emissions from woodyard activities. Resolute will submit woodyard VOC emission estimates when the U. S. EPA and/or NCASI develops validated VOC estimating methods.

6.2 Emissions from Road Activities

Dust emissions may occur from vehicular traffic on the facility's roads. Emissions from road activities were estimated using AP-42 emission factors, and the emission calculations are given on the following pages. In summary, the emission estimate is 34 tons/yr of PM-10.

6.2.1 Emission Factors

Fugitive emission factors were derived from the equations and data found in EPA's AP-42 "Compilation of Air Pollutant Emission Factors, Volume I: Stationary Point and Area Sources" pp. 11.2.1-1 through 11.2.6-5. This report documents the assumptions and calculations using data provided by Resolute representatives. The methods outlined in AP-42 were used to calculate emissions.

Emission factors were calculated using the following formulas found in AP-42. Formula 1 carries a quality rating of D for the calculations presented in this document, and Formula 2 carries a quality rating of B.

Formula 1 - Paved Roads Emission factor

$$E = 0.077 \times I \times (4 / n) \times (s / 10) \times (L / 1{,}000) \times (W / 3)^{0.7}$$

Formula 2 - Unpaved Roads Emission factor

$$E = 5.9 \times (s / 12) \times (S / 30) \times (W / 3)^{0.7} \times (w / 4)^{0.5}$$

where: E = emission factor (lb/vehicle mile traveled)
I = industrial augmentation factor (dimensionless)
n = number of traffic lanes
s = surface material silt content (%)
L = surface dust loading (lb/mile)

W = mean vehicle weight (tons)
S = mean vehicle speed (mph)
w = number of wheels

For traffic traveling entirely on paved roads and entering the site from paved roads, I=1.0 (AP-42, p. 11.2.6-3). This is the case for the roads at the Resolute site. All roads of interest on the site have two lanes (n=2).

The surface dust loading (L) was estimated to be 150 lb/mile, and the surface material silt content (s) was estimated to be 5% for all the calculations.

Loaded Long Pine Trucks on Paved Roads

$E = (0.077) \times (1) \times (4 / 2) \times (5 / 10) \times (150 / 1{,}000) \times (36.5 / 3)^{0.7}$
= 6.64 E-2 lb/vehicle mile traveled

Loaded Short Pine Trucks on Paved Roads

$E = (0.077) \times (1) \times (4 / 2) \times (5 / 10) \times (150 / 1{,}000) \times (19.8 / 3)^{0.7}$
= 4.33 E-2 lb/vehicle mile traveled

Loaded Chip Trucks on Paved Roads

$E = (0.077) \times (1) \times (4 / 2) \times (5 / 10) \times (150 / 1{,}000) \times (45 / 3)^{0.7}$
= 7.69 E-2 lb/vehicle mile traveled

Loaded Residue Trucks on Paved Roads

$E = (0.077) \times (1) \times (4 / 2) \times (5 / 10) \times (150 / 1{,}000) \times (42.7 / 3)^{0.7}$
= 7.41 E-2 lb/vehicle mile traveled

Loaded Chemical Fuel Trucks on Paved Roads

$E = (0.077) \times (1) \times (4 / 2) \times (5 / 10) \times (150 / 1{,}000) \times (37.5 / 3)^{0.7}$
= 6.77 E-2 lb/vehicle mile traveled

Loaded Market Pulp Trucks on Paved Roads

$E = (0.077) \times (1) \times (4 / 2) \times (5 / 10) \times (150 / 1{,}000) \times (37.5 / 3)^{0.7}$
= 6.77 E-2 lb/vehicle mile traveled

Loaded Black Liquor Skimmings Trucks on Paved Roads

$E = (0.077) \times (1) \times (4 / 2) \times (5 / 10) \times (150 / 1{,}000) \times (50 / 3)^{0.7}$
= 8.28 E-2 lb/vehicle mile traveled

Loaded Turpentine Trucks on Paved Roads

$E = (0.077) \times (1) \times (4 / 2) \times (5 / 10) \times (150 / 1{,}000) \times (40.13 / 3)^{0.7}$

= 7.1 E-2 lb/vehicle mile traveled

Loaded Newsprint Trucks on Paved Roads

$E = (0.077) \times (1) \times (4 / 2) \times (5 / 10) \times (150 / 1{,}000) \times (37 / 3)^{0.7}$

= 6.70 E-2 lb/vehicle mile traveled

Loaded Coated Paper Trucks on Paved Roads

$E = (0.077) \times (1) \times (4 / 2) \times (5 / 10) \times (150 / 1{,}000) \times (36.25 / 3)^{0.7}$

= 6.61 E-2 lb/vehicle mile traveled

Loaded Landfill Trucks on Unpaved Roads

$E = (5.9) \times (5 / 12) \times (15 / 30) \times (15 / 3)^{0.7} \times (6 / 4)^{0.5}$

= 4.64 lb/vehicle mile traveled

Unloaded Long Pine Trucks on Paved Roads

$E = (0.077) \times (1) \times (4 / 2) \times (5 / 10) \times (150 / 1{,}000) \times (15 / 3)^{0.7}$

= 3.56 E-2 lb/vehicle mile traveled

Unloaded Short Pine Trucks on Paved Roads

$E = (0.077) \times (1) \times (4 / 2) \times (5 / 10) \times (150 / 1{,}000) \times (10 / 3)^{0.7}$

= 2.68 E-2 lb/vehicle mile traveled

Unloaded Chip Trucks on Paved Roads

$E = (0.077) \times (1) \times (4 / 2) \times (5 / 10) \times (150 / 1{,}000) \times (15 / 3)^{0.7}$

= 3.56 E-2 lb/vehicle mile traveled

Unloaded Residue Trucks on Paved Roads

$E = (0.077) \times (1) \times (4 / 2) \times (5 / 10) \times (150 / 1{,}000) \times (20 / 3)^{0.7}$

= 4.36 E-2 lb/vehicle mile traveled

Unloaded Chemical Fuel Trucks on Paved Roads

$E = (0.077) \times (1) \times (4 / 2) \times (5 / 10) \times (150 / 1{,}000) \times (15 / 3)^{0.7}$

= 3.56 E-2 lb/vehicle mile traveled

Unloaded Market Pulp Trucks on Paved Roads

$E = (0.077) \times (1) \times (4 / 2) \times (5 / 10) \times (150 / 1{,}000) \times (15 / 3)^{0.7}$

= 3.56 E-2 lb/vehicle mile traveled

Unloaded Black Liquor Skimmings Trucks on Paved Roads

$E = (0.077) \times (1) \times (4 / 2) \times (5 / 10) \times (150 / 1{,}000) \times (15 / 3)^{0.7}$
= 3.56 E-2 lb/vehicle mile traveled

Unloaded Turpentine Trucks on Paved Roads
$E = (0.077) \times (1) \times (4 / 2) \times (5 / 10) \times (150 / 1{,}000) \times (15 / 3)^{0.7}$
= 3.56 E-2 lb/vehicle mile traveled

Unloaded Newsprint Trucks on Paved Roads
$E = (0.077) \times (1) \times (4 / 2) \times (5 / 10) \times (150 / 1{,}000) \times (15 / 3)^{0.7}$
=3.56 E-2 lb/vehicle mile traveled

Unloaded Coated Paper Trucks on Paved Roads
$E = (0.077) \times (1) \times (4 / 2) \times (5 / 10) \times (150 / 1{,}000) \times (15 / 3)^{0.7}$
=3.56 E-2 lb/vehicle mile traveled

Unloaded Landfill Trucks on Unpaved Roads
$E = (5.9) \times (5 / 12) \times (15 / 30) \times (5 / 3)^{0.7} \times (6 / 4)^{0.5}$
= 2.15 lb/vehicle mile traveled

6.2.2 Emission Rates

Once the emission factors were calculated using Formulas 1 and 2 above, emission rates were obtained for each vehicle by multiplying the emission factor by the distance traveled and then multiplying this product by the number of vehicles.

This emission rate was then multiplied by (k) (particle size multiplier) and a correction factor between zero and one which accounts for the number of rain days at the facility (p).

Page 11.2.1-4 of AP-42 shows that the number of rain days in the vicinity of the facility (p) is equal to 115. To calculate emission rates in lb/yr for suspended particulates, AP-42 states that a (k) of 1.0 should be used (AP-42, p. 11.2.1-3).

Formula 3 - Emission Rates

$\text{emission rate} = k \times E \times V \times d \times ((365 - p) / 365)$

where: k = particle size multiplier (dimensionless)
E = emission factor (lb/vehicle mile traveled)
V = number of vehicles per year
d = length of each trip (miles)
p= number of days with at least 0.01 inches of precipitation per year

Loaded Long Pine Trucks on Paved Roads

$E_{50\%}$ = (1) x (6.64 E-2) x (118,000 / 2) x (1.68) x ((365 - 115) / 365)
= 4507.92 lb/year

$E_{50\%}$ = (1) x (6.64 E-2) x (118,000 / 2) x (1.67) x ((365 - 115) / 365)
= 4481.09 lb/year

E_{total} = 4507.92 + 4481.09
= 8989.01 lb/year

Loaded Short Pine Trucks on Paved Roads

$E_{50\%}$ = (1) x (4.33 E-2) x (5,900 / 2) x (1.68) x ((365 - 115) / 365)
= 146.98 lb/year

$E_{50\%}$ = (1) x (4.33 E-2) x (5,900 / 2) x (1.67) x ((365 - 115) / 365)
= 146.11 lb/year

E_{total} = 146.98 + 146.11
= 293.09 lb/year

Loaded Pine Chip Trucks on Paved Roads

$E_{33\%}$ = (1) x (7.69 E-2) x (45,000 / 3) x (1.56) x ((365 - 115) / 365)
= 1232.51 lb/year

$E_{66\%}$ = (1) x (7.69 E-2) x (45,000 * 2 / 3) x (1.79) x ((365 - 115) / 365)
= 2828.45 lb/year

Loaded Hardwood Chip Trucks on Paved Roads

$E_{33\%}$ = (1) x (7.69 E-2) x (8,800 / 3) x (1.56) x ((365 - 115) / 365)
= 441.02 lb/year

$E_{66\%}$ = (1) x (7.69 E-2) x (8,800 * 2 / 3) x (1.79) x ((365 - 115) / 365)
= 553.12 lb/year

E_{total} = 1232.51 + 2828.45 + 441.02 + 553.12
= 5055.10 lb/year

Loaded Residue Trucks on Paved Roads

E = (1) x (7.41 E-2) x (22,700) x (1.94) x ((365 - 115) / 365)
= 2235.08 lb/year

Loaded Chemical Fuel Trucks on Paved Roads

$E_{20\%}$ = (1) x (6.77 E-2) x (3,600 / 5) x (2.17) x ((365 - 115) / 365)
= 72.45 lb/year

$E_{80\%}$ = (1) x (6.77 E-2) x (3,600 * 4 / 5) x (2.24) x ((365 - 115) / 365)
= 299.14 lb/year

E_{total} = 72.45 + 299.14
= 371.59 lb/year

Loaded Market Pulp Trucks on Paved Roads

E = (1) x (6.77 E-2) x (920) x (2.12) x ((365 - 115) / 365)
= 90.44 lb/year

Loaded Black Liquor Skimmings Trucks on Paved Roads

E = (1) x (8.28 E-2) x (101) x (2.21) x ((365 - 115) / 365)
= 12.66 lb/year

Loaded Turpentine Trucks on Paved Roads

E = (1) x (7.1 E-2) x (4) x (2.21) x ((365 - 115) / 365)
= 0.43 lb/year

Loaded Newsprint Trucks on Paved Roads

E = (1) x (6.70 E-2) x (4,100) x (0.73) x ((365 - 115) / 365)
= 137.35 lb/year

Loaded Coated Paper Trucks on Paved Roads

E = (1) x (6.70 E-2) x (6,650) x (0.44) x ((365 - 115) / 365)
= 134.28 lb/year

E_{total} = 137.35 + 134.28
= 271.63 lb/year

Loaded Landfill Trucks on Unpaved Roads

E = (1) x (4.64) x (18,000) x (0.5) x ((365 - 115) / 365)
= 28602.74 lb/year

Sum of Emission Rates for Loaded Trucks on Paved and Unpaved Roads

E = 898.01 + 293.09 + 5055.10 + 2235.08 + 371.59 + 371.59 + 90.44 + 12.66 + 0.43 + 137.35 + 134.28 + 28,602.74
= 45,921.77 lb/year

Unloaded Long Pine Trucks on Paved Roads

E = (1) x (3.56 E-2) x (118,000 / 2) x (1.68) x ((365 - 115) / 365)
= 2416.9 lb/year

E = (1) x (3.56 E-2) x (118,000 / 2) x (1.67) x ((365 - 115) / 365)
= 2402.51 lb/year

E_{total} = 2416.9 + 2402.51
= 4819.41 lb/year

Unloaded Short Pine Trucks on Paved Roads

E = (1) x (2.68 E-2) x (5,900 / 2) x (1.68) x ((365 - 115) / 365)
= 90.97 lb/year

E = (1) x (2.68 E-2) x (5,900 / 2) x (1.67) x ((365 - 115) / 365)
= 90.43 lb/year

E_{total} = 90.91 + 90.43
=181.30 lb/year

Unloaded Pine Chip Trucks on Paved Roads

E = (1) x (3.56 E-2) x (45,000 / 3) x (1.56) x ((365 - 115) / 365)
= 570.58 lb/year

E = (1) x (3.56 E-2) x (45,000 * 2 / 3) x (1.79) x ((365 - 115) / 365)
= 1309.4 lb/year

E = (1) x (3.56 E-2) x (8,800 / 3) x (1.56) x ((365 - 115) / 365)
= 111.58 lb/year

E = (1) x (3.56 E-2) x (8,800 * 2 / 3) x (1.79) x ((365 - 115) / 365)
= 256.06 lb/year

E_{total} = 570.58 + 1309.4 + 111.58 + 256.06
= 2247.62 lb/year

Unloaded Residue Trucks on Paved Roads

E = (1) x (4.36 E-2) x (22,700) x (1.94) x ((365 - 115) / 365)
= 1315.11 lb/year

Unloaded Chemical Fuel Trucks on Paved Roads

E = (1) x (3.56 E-2) x (3,600 / 5) x (2.17) x ((365 - 115) / 365)
= 38.1 lb/year

E = (1) x (3.56 E-2) x (3,600 * 4 / 5) x (2.24) x ((365 - 115) / 365)
= 157.30 lb/year

E_{total} = 38.1 + 157.30
= 195.40 lb/year

Unloaded Market Pulp Trucks on Paved Roads

E = (1) x (3.56 E-2) x (920) x (2.12) x ((365 - 115) / 365)
= 47.56 lb/year

Unloaded Black Liquor Skimmings Trucks on Paved Roads

E = (1) x (3.56 E-2) x (101) x (2.21) x ((365 - 115) / 365)
= 5.44 lb/year

Unloaded Turpentine Trucks on Paved Roads

E = (1) x (3.56 E-2) x (4) x (2.21) x ((365 - 115) / 365)
= 0.22 lb/year

Unloaded Newsprint Trucks on Paved Roads

E = (1) x (3.56 E-2) x (4,100) x (0.73) x ((365 - 115) / 365)
= 72.98 lb/year

Unloaded Coated Paper Trucks on Paved Roads

E = (1) x (3.56 E-2) x (6,650) x (0.44) x ((365 - 115) / 365)
= 71.35 lb/year

Unloaded Landfill Trucks on Unpaved Roads

E = (1) x (2.15) x (18,000) x (0.5) x ((365 - 115) / 365)
= 13,253.43 lb/year

Sum of Emission Factors for Unloaded Vehicles on Paved and Unpaved Roads

E = 4819.41 + 181.30 + 2247.62 + 1315.11 + 195.40 + 47.56 + 5.44 + 0.22 + 72.98 + 71.35 + 13,253.43
= 22,209.82 lb/year

Total Emission Rate for Loaded and Unloaded Trucks on Paved and Unpaved Roads

PM = 45,921.77 + 22,209.82
PM = 68,131.59 lb/year

Converting from pounds per year to tons per year:

PM = (68,131.59 lb/year) x (ton / 2,000 lb)
PM = 34.07 tons per year

6.2.3 Determination of Traffic Distances

Two site plans were utilized in determining the route lengths for the various vehicles that operate at the facility. Both site plans were supplied by Resolute. Site plan CTE-10CC-3041 was used to determine the distance from the Main Gate to the property line (0.22 miles) and the distance from the Primary Clarifier to the property line (1.34 miles). Site plan E-10-1-2 was used to determine the distance from the Main Gate or Primary Clarifier to the various loading and unloading points on the site. Distances are shown on the spreadsheets in Appendix A.

Site plan E-10-1-2 does not include a scale. Site plan CTE-10CC-3041 is scaled to 1 inch equals 300 feet. The ratio between numerous building dimensions on the two plans is between 0.3 and 0.4. After consultation with Resolute, a ratio of 0.38 was chosen to estimate the approximate scale of site plan E-10-1-2. Therefore, one inch on site plan E-10-1-2 is equal to 114 feet (300 ft x 0.38 = 114 feet).

6.2.4 Description of Traffic Data

Resolute supplied data on traffic patterns, traffic quantities, truck weights, road conditions, etc. The rest of the data was assumed or estimated by Rust E&I based on industrial operating conditions.

Long Pine Trucks

The average unloaded weight of long pine trucks is 15 tons. Each of these trucks carries an average of 8.75 cords of wood or 21.5 tons. Therefore, the average loaded weight of these trucks is approximately 36.5 tons.

One half of these trucks enter the site from the northeast and deposit wood at the East Log Storage. The distance from the Primary Clarifier to the East Log Storage is 0.33 miles. The remainder of these trucks enter the site from the northeast and unload wood at the West Log Storage. The distance from the West Log Storage to the Primary Clarifier

is 0.34 miles. The total number of long pine trucks entering and leaving the site is approximately 118,000 per year (323 trucks/day x 365 days/yr).

Short Pine Trucks

The average unloaded weight of short pine trucks was supplied by Resolute and is equal to 10 tons. Each of these trucks carries an average of 4 cords of wood or 9.8 tons. The average loaded weight is therefore 19.8 tons. All the short pine trucks enter and leave the site from the northeast. One half unload at the East Log Storage and one half unload at the West Log Storage. The total number of these trucks is approximately 5,900 per year (16 trucks/day x 365 days/yr).

Chip Trucks

Pine and hardwood chip trucks enter and leave the site from the northeast. One third of the chips are unloaded at the Chip Dumpster. The distance from the Primary Clarifier to the Chip Dumpster is 0.22 miles. Two-thirds of the chips are unloaded at Chip Unloading. The distance from the Primary Clarifier to Chip Unloading is 0.45 miles. The average loaded weight of these trucks is 45 tons, and the average unloaded weight is 15 tons. The approximate number of pine chip trucks entering and leaving the facility is 45,000 per year (123 trucks/day x 365 days/yr). The approximate number of hardwood chip trucks entering and leaving the facility is 8,800 per year (24 trucks/day x 365 days/yr).

Residue Trucks

The average loaded weight and the average unloaded weight of residue trucks are 42.7 and 20 tons respectively. Residue trucks are loaded near the Bark Storage and enter and leave the site from the northeast. The distance from the loading site to the Primary Clarifier is 0.6 miles. Approximately 22,700 residue trucks enter and leave the site each year (62 trucks/day x 365 days/yr).

Chemical and Fuel Trucks

Approximately 3,600 chemical and fuel trucks enter and leave the facility each year. The average loaded and unloaded weights of these trucks are 37.5 tons and 15 tons respectively. Eighty percent of the trucks unload at the Causticizing Area. Twenty percent unload near the Calcinated Clay Tanks. The distance from the Primary Clarifier to the Causticizing Area is 0.90 miles. The distance from the unloading site near the Calcinated Clay Tanks to the Primary Clarifier is 0.83 miles.

Market Pulp Trucks

Approximately 920 market pulp trucks enter and leave the site each year. The average unloaded weight of these trucks is 15 tons. The average load carried by these trucks is 22.5 tons. Therefore, the average loaded weight of these trucks is 37.5 tons. Market pulp trucks enter from the northeast and are loaded at the Pulp Dryer. The distance from the Primary Clarifier to the Pulp Dryer is 0.78 miles.

Black Liquor Skimmings and Turpentine Trucks

Black liquor skimmings and turpentine are loaded onto trucks that enter and leave the site from the northeast. This loading occurs near the Powerhouse. The distance from the loading site to the Primary Clarifier is 0.87 miles. The average unloaded weight for these trucks (15 tons) was supplied by Resolute.

Each black liquor skimmings truck carries an average load of 7,000 gallons. A conservative value for the density of black liquor skimmings was used to find the mass of these loads. This value is 10 lb./gallon. Therefore, the average load weight is 35 tons, and the average loaded weight for these trucks is 50 tons. Approximately 101 of these trucks enter and leave the site each year. Approximately four turpentine trucks enter and leave the site each year. The average turpentine load on each truck is also 7,000 gallons. The density of turpentine was found to be 7.18 lb/gallon (The Condensed Chemical Dictionary, 8th Ed.). Therefore, the average weight of the load carried by turpentine trucks is 25.13 tons, and the average loaded weight is 40.13 tons.

Manufactured Products Trucks

Manufactured products trucks enter and leave the from the Main Gate. Newsprint is loaded at No. 3 Shipping. The distance from No. 3 Shipping to the Main Gate is 0.51 miles. The average unloaded weight of newsprint trucks (15 tons) was supplied by Resolute. The average weight of the load carried by these trucks is 22 tons. The average loaded weight of these trucks is 37 tons. Approximately 4,100 newsprint trucks enter and leave the site each year.

All coated paper is loaded at No. 2 Shipping. The distance from No. 2 Shipping to the Main Gate is 0.22 miles. Approximately 6,650 coated paper trucks enter and leave the facility each year. The average unloaded weight of coated paper trucks (15 tons) was supplied by Resolute. The average weight of the load carried by these trucks is 21.25 tons. Therefore, the average loaded weight of these trucks is 36.25 tons.

Landfill Trucks

Resolute supplied the route length for landfill trucks. This distance is 0.5 miles for both loaded and unloaded trucks. These trucks travel on an unpaved two lane road with a speed limit of 15 mph. The average loaded weight of these trucks is 15 tons, and the average unloaded weight is 5 tons. Each truck has 6 wheels. Approximately 18,000 (50 trucks/day x 365 days/yr) of these trucks operate on the site each year.

6.3 Industrial Landfill

A 15-acre industrial landfill is located west of the paper machines at Resolute's Catawba facility. Paper, bark, and other wood product wastes are deposited within the landfill on a daily basis. While mill refuse is disposed on-site, commercial and office waste streams are collected and transported off-site for disposal. Fill dirt is removed from the on-site borrow pits and deposited atop the refuse as daily cover. From communications with mill personnel and from comparisons with similar pulp and paper mills, it is conservatively assumed that the maximum disposal rate is 30 tons/day.

6.3.1 Emission Calculations

Emissions from the landfill are primarily in the form of PM and VOCs. EPA Document 450/3-77-010 reports emission factors for PM, but there are currently no approved methods for estimating VOC emissions from an industrial landfill at an integrated pulp & paper mill.

6.3.2 Particulate Matter Emission Estimates

The dumping of refuse in landfills may be a potential source of particulate emissions. EPA Document 450/3-77-010 states, "for most waste dumps, there are emissions when the material is dumped onto the pile but probably only minimal additional emissions from wind erosion due to a lack of small particles on the surface. An emission factor of 10 g/Mg (0.02 lb/ton) has been used to estimate dust emissions from truck dumping of large material." This emission factor will be used to estimate particulate emissions from dumping of refuse into the industrial landfill at this facility. Potential PM emissions (in the form of PM-10) are:

PM = (0.02 lb/ton) x (1,000 tons/day) x (365 days/yr) x (ton/2,000 lb)
PM = 4 tons/yr

6.3.3 VOC Emission Estimates

VOC emissions from the landfill may be present, but currently there are no approved methods to quantify these emissions.